GAS JOURNAL, MAR. 22, 1944

VOL. 243 96th YEAR No. 4218

EDITORIAL NOTES

DOMESTIC FUEL POLICY

ON several occasions we have expressed the view that the most practicable solution of the domestic fuel question in the immediate post-war years lies, in the interests of coal conservation, smoke abatement, and general amenity, in the extended use jointly of gas and coke. Such a policy would be within the bounds of the likely purchasing power of the mass of the community. All-gas schemes and all-electric schemes have obvious popular appeal, but we must have regard to economic considerations, and also the need for meeting the chemical industries' demands for raw materials. Coal conservation and cost for heat service given rule out any general all-electric idea. As far as complete gasification is concerned, development of processes now being actively investigated may put a very different light on the all-gas idea—we are thinking in general terms from the point of view of the vast majority of the public—but we are not yet in a position to assess the economic and technical possibilities of such processes.

It seems to us that in the immediate post-war years, whatever the costs to the consumer of the various fuels—raw coal, smokeless solid fuel, gas, oil, and electricity—the economic picture will relatively to individual income be pretty much the same as it was in 1939. But in 1939, and before that, there existed practical proof that gas and coke could, in combination, give a far better service than could be obtained by the use of coal, and that this better service cost no more money. The same situation will, we think, roughly hold on the cessation of the war. There is no doubt, however, that the war has made us become more fuel-conscious; it has brought into the foreground the imperative need to utilize our coal wisely, and we believe there is a far greater desire to mitigate the smoke evil.

We have heard much of late of the advances in design and efficiency of appliances constructed to burn raw coal. Accompanying these advances there has been development in domestic coke-burning appliances. And bearing in mind the very high efficiency and very great convenience of 1939 gas-burning equipment, which had a standard of performance much higher than that represented on average by the gas appliances in use throughout the country, we again arrive at the conclusion that the relative fuel position immediately after the war will show no startling change. In general, it seems to us that we shall find ourselves more or less where we left off in the post-war competitive fuel race. The problem before us is, of course, how we intend to continue the course. We hope that the competitive element will be modified, that, while the spur to effort will remain, there will be less purely destructive competition between gas and electricity, and that the enlightenment gained in the war years regarding the wise use of coal will see the putting into practice of plans to abolish smoke.

Electricity will find an extended sphere of application; we have no doubt at all about that. But the possibilities which lie before the Gas Industry are vast, and we are convinced that there will be great extension of its domestic services. As is generally known, it is estimated that 4 million new houses will have to be built in the 10-year period after the war, the while obsolescence of other houses will continue. An annual programme of about 500,000 dwellings has been suggested in knowledgeable circles. Domestic heating arrangements in this country have been far too inefficient and certainly inadequate, and the provision of hot water has been scanty. We think that some means of economic adjustment will make it possible to secure higher hygienic standards. In July of last year Lord Portal appointed an expert mission to visit the United States to survey American practice in the design, construction, and equipment of buildings. Following their visit the mission reported that "the most noteworthy improvements in general housing amenities were of a kind that involved a considerable increase in the consumption of electricity, gas, and water, and they mentioned specially that the average consumption of water per head of population is more than double the British rate. From other sources we know that the useful heat per household is roughly three times as great in the U.S.A. as in Great Britain—due in part no doubt to the greater severity of the American winter, but not, we think, unconnected with a higher standard of living.

In this country the demand for greater domestic amenities will be insistent, and the Gas Industry will be called upon to play an ever-increasing part. And we are sure that the part which in fact it will eventually play will depend on the type of heat service, in the joint forms of gas and solid smokeless fuel, which it will be able to offer. In preparation for satisfying a widely extended market we must find the most economical solution of the problem of removing sulphur as completely as possible from gas, and we must tackle the question of purchasing in the years after the war coal as free from ash as is economically possible. These are two important points. There are many others, of course, and some of them were dealt with recently by Mr. W. R. Branson in a Paper the publication of which we begin to-day, and which really gave rise to the foregoing thoughts. It is a lucid and dispassionate survey of the domestic fuel situation and likely future needs, and it contains some very useful data which surely indicate the extent of the field which lies before us—a field the scope of which should encourage us to get together in the interests of the consumer, and incidentally to our own advancement.

LEEDS UNIVERSITY

WE have before us the report for 1942–43 of the Livesey Professor at Leeds University, Dr. Townend, and it is a record of extended activity in the Fuel Department, which has been called upon to meet—and has obviously met successfully—heavy wartime demands during the period under review. More investigations are in progress for Government Departments, the number of students and research workers accommodated has exceeded previous figures, and students have been provided with post-graduate courses in fuel technology to meet the present need. And it is good to note that during the period fresh equipment has been installed in the Department which has helped to widen the scope of its activities—acquisitions rendered possible through the allocation to the University by the Joint Standing Finance Committee of the I.G.E., the N.G.C., and the B.C.G.A. Other apparatus has been acquired as the outcome of wartime commitments. Needs, however, remain heavy. Increased income to supplement that available from University sources is required, and it is a matter for gratification that the Joint Finance Committee of which we have spoken appreciates the matter and has given favourable consideration to this end. Regarding training, as is well known, the Ministry of Fuel and Power found it necessary to create a staff of technologists in order quickly to reinforce the number available for its fuel-saving campaign. It was decided to recruit these from chemical students graduating with honours, and to provide for them intensive courses in fuel technology. The first batch was allocated to the Fuel Department at Leeds, and the experience suggested that the anticipated stringency in coal supply would render it advantageous permanently to offer such instruction. The University has acted accordingly.

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University. Difficulty in obtaining delivery of materials at the present time has caused further delay with the erection of the semi-scale plant for studying the hydrogenation of coal at high temperatures and pressures, but the Woodall-Duckham Companies have now almost completed the plant and experimental work should start before very long. In the meantime the investigation of the enrichment of gas by catalytic synthesis has been continued. Further progress has been made towards the design of a large-scale plant, and systems can now be operated satisfactorily without the recirculation of gas as previously proposed, though gas recirculation does allow a simplification of plant construction. Further work has been carried out on the catalytic removal of organic sulphur from synthesis gas as well as from town gas. And as a preliminary towards closer control of gas composition the Committee has recently undertaken to explore the variations of "gas quality" which now exist by making observations at the works of a number of representative undertakings. Preparations for this survey, which will also include observations on the nature and amounts of the various organic sulphur compounds in gas, are now in hand. Investigation has been continued into the stability of aerated burner flames. We have mentioned a few only of the activities covered by the Fuel Department during a wartime session. Naturally in the circumstances the services of Dr. Townend have been called upon continuously by various Ministries in furtherance of the war effort, and altogether the energy he has displayed has been quite remarkable, as evidenced by the report we have touched upon and of which he may well be proud.

Correction

Discussing electricity plans in the "JOURNAL" of Feb. 9, and again in the "JOURNAL" last week, we referred to the report of a committee representing more than 90% of the municipal and company distribution undertakings of the country, stating that the committee in question was set up at the request of the Minister of Fuel and Power. We are informed that our information was inaccurate in this respect, and that in point of fact the Minister made no request of this nature.

Electrical Criticism

At a luncheon last week of the Electrical Development Association, Lord Brabazon, who presided, said there was being "conceived in the bowels of the Ministry of Fuel and Power a monster—which we hope will be stillborn—to be called the National Fuel Advisory Council. That sounds all right, but it means nothing. But what it is going to do, or what some people want it to do, is to regulate who should use one form of power or light and who should use another. I ask the Minister of Fuel and Power to think again. Much as we regret his experience in the coal trade and sympathize with him in the trouble and anxiety that it must have caused him, that will be as nothing compared with what he is running up against if he goes on with this proposal or tries to put a quick one across us in wartime. We may have differences on some points, but on this particular one there will be such a combined front as has never been seen before in the electrical industry."

Personal

Mr. A. E. BROADBERRY has resigned his seat on the Board of the Tottenham and District Gas Company. He became an articled pupil in 1879 and he retired as Chief Engineer and General Manager in 1922, since when he has been a Director. During the 65 years he has been with the Company the output of gas has increased by 65 times.

The vacancy on the Board has been filled by the appointment of Mr. E. J. K. Fussell, who has just retired from the position of Secretary, and Mr. R. H. Epps, his Chief Assistant for many years, has been appointed to take his place. As we announced in the "JOURNAL" of March 31 last, Mr. Fussell was appointed an additional Director of the Company at that time.

* * *

Mr. T. L. TALLENTIRE, who has been Engineer to the Dursley Gas Light & Coke Company, Ltd., and to the other adjoining Group Constituent Companies of the South-Western Gas & Water Corporation, Ltd., since 1936, has been appointed Engineer and General Manager at Dursley. This Company now supplies in bulk all the gas requirements of the Wotton-under-Edge and District Gas Company, some six miles distant.

* * *

The Directors of Messrs. William Sugg & Co., Ltd., announce the appointment of Mr. W. T. MATTOCK as Joint Managing Director, in succession to his father, the late Mr. W. G. H. Mattock. Mr. W. T. Mattock will act in collaboration with Mr. Philip H. Sugg, the present Chairman and Managing Director.

* * *

As from Jan. 1, Colonel JOHN HARVEY HULBERT, R.A., has been appointed to the Board of Messrs. Burts & Harvey, Ltd., and as from Jan. 11, Mr. HENRY HUTCHINSON BATES and Mr. LEONARD ALFRED DRAPPER have also been appointed to the Board.

* * *

The University of London has conferred the Degree of Doctor of Philosophy (Ph.D.) on Mr. N. R. BISHOP, B.Com.(Lond.), of Tar Residuals, Ltd. Dr. Bishop has been on the staff of Messrs. Walter Waugh & Co., Ltd., and Tar Residuals, Ltd., for over 24 years.

Obituary

The death occurred on March 14 of Mr. FRANK PRENTICE, the former Engineer and Manager of the Ipswich Gas Light Company and a Director of the undertaking since his retirement in 1932.

Mr. Prentice, who was 82, commenced his service with the Ipswich Gas Company in August, 1881, as chemist, under Mr. Ebenezer Goddard, father of Mr. D. Ford (afterwards Sir Daniel) Goddard, then the assistant secretary and engineer. On the death of his father in 1882 Mr. Ford Goddard assumed the chief position, with Mr. Prentice as assistant. Five years later, when Mr. Goddard relinquished industry for politics, Mr. Prentice continued as Works Manager, and in 1914, when the executive duties were reorganized to meet the expansion of the Company's business, he became Engineer and Manager, with Mr. G. A. Mallett as Secretary.

Letters to the Editor

Gas Industry Literature

DEAR SIR,—I read with great interest Mr. Tomlinson's article in your issue dated March 1, in which he pleaded for a new standard text-book on the Technology of the Gas Industry.

I would like to endorse the opinions he expresses, for there can hardly be any other large specialist industry so poorly served. The subjects coming within the purview of the Gas Industry are so wide that what seems to be required is a collected work with authoritative articles by specialists. I visualize a publication such as *The Science of Petroleum*, published by the Oxford University Press just before the war. The articles therein make most informative and interesting reading, quite apart from their value for reference purposes.

It might well be that one of the University Presses would help in this matter, as they are not so essentially interested in making profits as in disseminating scientific and technical knowledge.

I raised this matter in London soon after taking up my duties in Leeds, but the war intervened and possible authors became preoccupied. The time, surely, is now ripe for such a venture to receive the serious consideration of the Gas Industry.

The University,
Leeds 2.
March 18, 1944.

Yours faithfully,
D. T. A. TOWNEND,
Livesey Professor.

DEAR SIR,—Mr. T. A. Tomlinson's Paper on "Literature of the Gas Industry" appears at an opportune moment for consideration by our leaders in "Post-War Reconstruction." So far I have not seen this basic subject mentioned in any reconstruction programme, and now that we are familiar with the term "Reconstruction" we are more able to put "first things first."

A standard reference visualized by the author would be an untold blessing, and I support the suggestion that the Gas Industry should bear the cost and preparation through the British Gas Federation. If compiled in loose leaf form constant review would be possible and conciseness maintained—both so desirable owing to the complex nature of our raw materials and the large number of industries we serve and are served by. Moreover, the periodic arrival of revised or additional literature sheets would keep the personnel of the Industry abreast of the times.

I suggest such a standard reference would induce uniformity and speed-up of development, and would not deter "private enterprise" from continuing to add to our literary store. An author will always have his readers and be referred to for many reasons, and therefore Mr. Tomlinson's request for an abstract of such works with adequate classification and cross-reference should be prepared at the same time.

The publication of these works in loose-leaf form could form a basis of charge partly to finance the scheme.

Mr. Tomlinson's able article is rich in avenues for thought, and he is to be congratulated on the thorough way he has presented this difficult and neglected subject. He prompts me to ask, will the future call for an all-round training which demands a standard reference, or will integration be the policy with its call for the super specialists for departmental control?

Corporation Gas-Works,
St. Helens.
March 17, 1944.

Yours faithfully,
R. J. BRADSHAW,
Deputy Engineer and Manager.

Gas-Fired Circulators

DEAR SIR,—On page 338 of your issue of March 15 you publish, on the ultimate authority of the President of the Institute of Heating and Ventilating Engineers, figures for producing a therm of hot water by various fuels. From these we learn that gas boilers have an efficiency of use of 70%, at which the cost per therm of useful heat is 11.5d.

By a singular coincidence you publish, in an advertisement in the same issue, what purports to be an authoritative data sheet for architects. From this we learn that a gas boiler has an efficiency of utilization of 30%, and a fuel cost per therm of hot water of 27d.

The only difference in condition is that the first figures presumably apply to industrial, and the second to domestic use.

Although I should be loth to differ from Dr. Oscar Faber I should imagine his figures are *optimum* and not average, while the others, if I may coin a word, are just as much *pessimum*. If so it is unfortunate that they should be allowed to go before architects in the guise of reliable data published in the interests of gas.

Perhaps some of your public could tell us, from experience, which of the above figures is nearer the truth.

London. Yours faithfully,
March 17, 1944. ARTHUR FORSHAW.

National Gas Council

A Meeting of the Central Executive Board of the National Gas Council was held on March 14 at Gas Industry House. The Chair was taken by Mr. Frank H. Jones (Vice-Chairman).

A report on the general coal position was received. A letter from the Council to the Ministry of Fuel and Power dated Feb. 15 had been circulated, protesting against the further average increase of 3s. per ton in the price of coal, together with a reply from the Ministry dated March 2. It was also reported that the Coal Controller had offered to receive a deputation from the Conjoint Conference on the various matters raised by the Conference in earlier letters. The Coal Committee of the Conference had, at their meeting on March 8, decided to thank the Controller for his willingness to receive a deputation, but suggesting that, having regard to the position in the coalfields, such meeting should not take place until shortly after Easter.

Dr. Evans, Chairman of the Gas Advisory Committee, reported the proceedings at a meeting of the Committee hald the previous day. Among the matters discussed at that meeting were: (*a*) Simplified form of application for undertakings requiring to increase their charges for gas; (*b*) retention of casual labour during the summer months; (*c*) gas producers; (*d*) weather forecasts and retort house practice; (*e*) the provision of (i) wash boilers, and (ii) gas pendants.

It was stated that a letter had been circulated from the Ministry of Fuel and Power dated March 7, from which it was seen that an Interdepartmental Committee had been set up under the Chairmanship of the Solicitor-General to examine relations between statutory undertakers and planning authorities and to make recommendations. A small Sub-Committee was appointed to assist in the preparation of a statement of the views of the Gas Industry in the matter.

It was recalled that at the previous meeting of the Board the Benzole Committee of the Council had nominated certain representatives to serve on the Benzole Advisory Committee which was being set up by the Ministry of Fuel and Power. It was subsequently learned, however, that acceptance of these nominations would have made the Committee too unwieldy, and the Ministry had asked whether the National Gas Council would be prepared to limit their nominations to a smaller number. The Benzole Committee had now put forward the following names for consideration—*viz.*, Col. H. C. Smith, Mr. C. S. Shapley, Col. W. Moncrieff Carr, and Mr. W. G. Adam, which the Board approved.

It was reported that the difficulties of completing the return required by the Ministry of Fuel and Power under Section 15 of the Gas Regulation Act had been discussed by the Gas Advisory Committee at their meeting the previous day, when the representative of the Ministry of Fuel and Power had stated that half the returns had already been received, including a proportion of municipal undertakings.

It was stated that the Council had been asked by the Federation of British Industries to nominate three representatives to attend a meeting of Trade Associations to be held at the Central Hall, Westminster, on March 28, at which Lord Woolton would be present. Nominations to this meeting were left to the Council of the British Gas Federation.

It was agreed that the next meeting of the Board should take place on April 18 at 2 p.m.

The Minister of Fuel and Power has, under the Control of Fuel (No. 3) Order, 1942, given a General Direction (Standard of Lighting) No. 2 (S.R. & O. 1944, No. 234). This Direction amends the General Direction (Standard of Lighting) No. 1 (S.R. & O. 1943, No. 1210), which lays down the maximum standards of illumination in shops, hotels, restaurants, and places of public entertainment, sport, and meeting. The amendment provides that as from March 20, the maximum standard of lighting in any room, compartment, or enclosed space shall be calculated separately, and shall not be affected by the fact that the lighting used may also incidentally illuminate some other place. The Direction is on sale from H.M. Stationery Office, price 1d.

Gas Light and Coke Company

The Ordinary General Meeting of the Gas Light and Coke Company was held on Mar. 16 at Gas Industry House. Sir David Milne-Watson, Bt., LL.D., D.L., the Governor, presided.

In his statement circulated with the directors' report the Governor said: My first duty, which is a very sad one, is to report the great loss we have sustained in the death of Mr. R. M. Holland-Martin. He became a director of this Company in 1917, and has been a most valued colleague. He was always ready to give us his advice and assistance. This was particularly helpful owing to his long and wide experience of men and affairs. He had a charming personality and he will be greatly missed by us all.

In the New Year we heard with pleasure that the King had honoured Sir Harold Hartley by creating him a K.C.V.O.; this news has been received with great satisfaction generally.

This is now the fourth year in which I am unfortunately unable to produce the accounts of the Company for the benefit of the stockholders. No one regrets this more than I do, because it is very difficult to give you a picture of the activities of the company unaccompanied by figures. However, as you already know, the Government have decided that it is inadvisable in wartime for public utilities to disclose their accounts.

That there has been a satisfactory improvement in our business is quite evident from the fact that last September we were able to pay an interim dividend on the Ordinary stock of 1½%, and that we are now able to recommend a final dividend of 2½%, making a total of 4% for 1943. This also gives some indication of the way in which the Company has recovered from the difficult position in which it found itself after the blitz of London. I am sure that this comes as very good news to the stockholders.

Doubtless most of you are aware that the Gas Industry has prepared a report on planning. While, as one might expect in an Industry of the size of ours, this report did not receive unanimous approval, yet an overwhelming majority of the Industry agreed that it should be submitted to the Minister of Fuel and Power. The feeling, however, is strong that no case can be made out for nationalization, and the report has given reasons at considerable length for this conclusion. It is on the foundations of private enterprise that the prosperity and greatness of this country have been built; in the Gas Industry municipal enterprise has also played a notable part. Benefits should certainly accrue from a degree of closer association with the Ministry of Fuel and Power, but there are no grounds for suggesting that company and municipal enterprise stands condemned.

It is generally admitted, however, that there is need for some measure of reorganization and integration in the Industry if it is to fulfil its function as one of the great fuel industries of the country, and this has been fully recognized in the report. The report proposes that the Industry should be allowed to develop itself by evolutionary methods within regional limits, and definite proposals have been made with regard to integration. The formation of a tribunal to which appeal can be made when differences arise from proposals for integration has been suggested, and the reorganization of the national bodies at present representing the Industry and the establishment of a National Fuel Advisory Committee are advocated. This last proposal has, I am glad to say, met with general approval. I hope that it will be accepted by Parliament, as in my judgment it will lead to the conservation of our fuel resources—a matter of fundamental importance to this country.

I wish to pay a tribute to the officers and staff of the Company generally; from the highest to the lowest they have worked with good will. The weather has helped greatly, but with wartime difficulties the task of supplying gas has not been easy, and I should like to mention for special commendation the works' staffs, who have carried out their duties in the most trying circumstances.

Our men and women on National Service are continuing to give a good account of themselves, and I wish that I could tell you in detail of the distinctions they are earning and the responsibilities many of them are carrying so worthily; we record with pride that there are over 7,000 of them in the armed and auxiliary forces, apart from large numbers in war industry and on Civil Defence. The number who have made the supreme sacrifice has increased during the past year, and our sympathy goes out to their families and friends.

In the fifth year of war we can perhaps venture to look forward to a time when our energies will be put to reconstruction, and I can say with confidence that no small part of our strength to meet the future will lie in those who have been tested by strenuous years spent in the service of their country.

The proposed dividends were approved, the retiring directors, Sir Harold B. Hartley and the Viscount Mersey were re-elected, the auditors, Mr. P. H. Ashworth and Mr. H. E. Ibbs, reappointed, and the proceedings terminated with a vote of thanks to the Governor, Directors, staff and employees.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

TARGET FOR TO-MORROW*

By Dr. E. V. EVANS, O.B.E.

IT is now known generally that a Committee is to be appointed by the Minister of Fuel and Power to advise him upon a national fuel policy, and another to advise him upon the recommendations of the Planning Report of the British Gas Federation. It is to be expected that, among other matters, the latter Committee will investigate the question of the ownership of our gas undertakings. In passing, may I say it is most interesting to watch the present tussle for ownership of an Industry once thought to be dying. One is reminded of the man who thought the British Lion was decadent or dead until he prodded it.

By the time that evidence has been presented to these Committees and the Committees have framed their recommendations, many months will have passed. It is not to be expected that our Industry will stand still while waiting for these decisions, however important they may be. Apart from ownership, the Industry has a pressing job of work to do. That work is to extend our service to the nation and to the community in the immediate future, and to prepare our technical and service programmes for the more distant future.

Technical Integration

In this present Address, therefore, I propose not to examine the question of ownership or even to speak of the necessity of a modified national association, but to remind you of some of the technical problems that will require our attention—problems that must be met whoever may be the owners or whatever may be the structure of the new British Gas Association. In my opinion a most important present task of the British Gas Federation—a task that will eventually devolve upon the new Association—is to bring about greater "technical integration" in our Industry.

It is necessary to consider what is meant by "technical integration," and why closer integration in this sense will become necessary. As an Industry we exist in order that we may render a service required by the community. We shall continue to exist and to prosper to the extent to which we render that service faithfully and well. The price we charge for that service is a most important matter in judging its efficacy. We have every reason to be proud of our past and present achievements. For more than a century and a quarter we have developed and changed our Industry to meet the constantly changing needs of the times. The response of the Gas Industry to the enormously increased demand for gaseous fuel in war factories is no more than the latest example of our ability to adapt ourselves to changing circumstances.

The Gas Industry's idea of service does not end with the simple provision of gas and coke. The public would never have adopted gas for lighting and, later, for cooking, space heating and other uses if we had merely made the gas and piped it to their houses, leaving them to do the rest. If the housewife wants a supply of hot water, or if industry wishes to anneal some metal stampings, our service is not complete unless the hot water is available at the time, at the place and at the temperature required, or until the annealing is carried out efficiently and expeditiously. Now this conception of the service required of us has meant the building up of an immense organization employing specialists, not only in the various phases of gas production and distribution, but also in the many applications of gas and in the design and installation of the appliances in which gas is used.

Our work has led us into many fields that might seem remote from the carbonization of coal. We are keenly interested in all matters relating to the construction of dwellings and to the way in which the people live, because our service is intimately bound up with their lives and, indeed, exists for the purpose of making those lives easier, healthier and pleasanter. We can take credit for having kept abreast in these and other matters of social progress, and, further, may claim to have played our part in making such progress possible. But we can never say that we are satisfied, for progress is continuous.

In comparison with alternative methods of fuel supply, we can to-day claim that by the use of gas and coke the fuel user, whether in the small dwelling or the large factory, can obtain the maximum advantage in convenience and cleanliness at minimum cost. At the same time our Industry serves the nation by economy in the use of coal, by the reduction in atmospheric pollution, and by the availability of secondary products.

Let us not, however, be complacent for, in spite of these achievements, our lead over other fuel services will not be maintained unless we exert constant effort for improvement and show willingness to adapt our methods, even to the extent of radical alterations, as the requirements of the public change and as new methods of meeting these requirements are developed.

Now it is no reflection upon the ability of the individuals concerned if we admit frankly that many undertakings have been embarrassed by the complexity of the problems that have arisen when the war brought large industries and a large influx of workers to their districts of supply. The numbers of the technical and expert staff of any undertaking must have a relationship to the size of that undertaking's business, and however competent the individuals may be, they cannot be expert in all of the many matters involved in the Gas Industry's service. It is a great tribute to them and to the co-operative spirit within the Industry that so many difficulties have been overcome. In overcoming these difficulties the value of such organizations as the Regional Gas Engineering Advisory Boards and the Industrial Gas Centres has been demonstrated beyond question. This is the beginning of technical integration, but it is only the beginning.

Our next problem will be to assist in transforming a nation at war to a nation at peace. In providing adequate homes for the people it must be the concern of the Gas Industry to see that the service given is the best that is possible by modern standards. Immediately there arises the question of what we mean by modern standards, and who is to establish those standards. It is clearly impossible to define standards of fuel service from any theoretical or abstract basis. We can only take examples from those places where local initiative has demonstrated what can be done and then see how far, and with what necessary modifications, the same achievement can be repeated, or even improved upon, in other places. There are many places in the country where ingenious minds are at work, and this makes it all the more important that there should be free interchange of experience and information.

It is evident that the Industry needs a system of consultative centres, testing laboratories and bureaux whose duty it will be to remain constantly informed of all advances in practice and technique and to make this information available to all gas undertakings. This does not mean bureaucratic control. The laboratories and bureaux must be the servants and not the controllers of the undertakings. For this reason it will be necessary that they should be established and maintained by the district organizations and financed on a contributory basis. If so constituted, individual engineers and managers will feel that they have a right to assistance in their own problems as well as a duty to contribute their experiences to a common pool. This defines very generally what is meant by technical integration, and a scheme for taking the first step in this matter is receiving the consideration of the Council of the British Gas Federation.

The establishment of regional bureaux and laboratories should do much to ensure the general maintenance of the highest standard of service practicable with to-day's knowledge and to-day's facilities. Such laboratories should be equipped also to deal with the day-to-day problems that arise in the gas manufacturing process—the next stage in the development of the Regional Gas Engineering Advisory Boards. But we must take one step at a time.

Fuel Conservation

The knowledge and experience accumulated in our Industry to-day is immense, and we must create the machinery to make it available at the appropriate place and at the appropriate time. But this knowledge and experience of to-day must be extended and developed to meet the requirements of to-morrow. And this is our second task. Our Industry must seek further to conserve the national fuel resources. Developments in the use of raw coal and in the generation and application of electricity will certainly take place, and the stimulus of competition from these complementary sections of the fuel industry will be a constant urge to further endeavour. I am hopeful that in the big task of restoring peaceful prosperity we can avoid uneconomic competition with its diversion of so much effort from the real task of improving our service, but I should be sorry indeed to see an entire absence of competition, for then we might be tempted to seek the easiest and not the best.

Let us consider our present achievement in conserving the national fuel resources when applying gas and coke as fuels in the home. We do know from experience in many houses of the smaller type that a really adequate fuel service can be obtained from the use of 300 therms of gas and 40 cwt. of coke annually. By adequate I mean a much better service than most families enjoyed before the present war. An equally adequate and more convenient service can be obtained in the same house from 600 therms of gas. Now the 300 therms of gas and the 40 cwt. of coke will have been obtained by the carbonization of 4 tons of coal. If the consumer wanted the more convenient service and used wholly gaseous fuel we should have carbonized 8 tons of coal and disposed of 4 tons of coke to the coke market, this still representing a net requirement of 4 tons of coal.

Now if this house had been heated and the hot water and cooking also provided by the combustion of raw coal in existing types of appliances, it would have required at least 7½ tons of coal to do the work.

If electricity had been used entirely we should expect a consumption of some 10,000–12,000 k.w.h., requiring the expenditure at the power station of 6–7 tons of coal.

Clearly the use of gas and coke does conserve coal to a large extent.

But let us now suppose that the house is provided with the much more efficient raw coal using appliances which, we are told, will certainly be available in the future. The coal requirement might then

* An Address to the Southern Association of Gas Engineers and Managers, March 21, 1944.

be reduced to some 5 tons per annum. And if the electricity generating stations find in the future that they are able to put to useful effect the heat now lost in the cooling water as, for example, by the development of district heating, their figure for coal consumption may be reduced appreciably. Thus we see that in this important matter we cannot afford to stand still—but then we have no intention of doing so.

It is most encouraging to know that if the heating of the main living-room were accomplished by a convector gas fire with an efficiency of 60%—and we can be sure that such appliances will be available—the gas required by this house would be reduced to 540 therms per annum and the coal consumption to 3.6 tons. Even this is not good enough.

Total Gasification

As you know, the Gas Research Board is seeking new processes for the complete gasification of coal with the aim of producing 200–240 therms of gas from a ton of coal and of a calorific value suitable for general distribution. If we ever achieve this and the process may be applied economically in the Industry, we shall then be able to reduce the coal requirement for this house to about 2½ tons of coal a year.

It is our duty to explore thoroughly the practicability of converting coal completely to gas and to liquid hydrocarbons. At the present time our service, which offers smokeless solid fuel as well as gaseous fuel, accords well with the requirement of most domestic users, and we must not, to the slightest degree, relax our efforts to supply our domestic coke market with material completely suitable for the purpose required of it. But I believe that, as the future trend is strongly towards labour-saving wherever possible, those fuels which are most flexible and automatic in their use—notably gas and electricity—will come to be preferred to the exclusion of fuels in solid form. Provided always, of course, that the cost is not unreasonable.

The total conversion of coal into gas is no new project, but the application of the known processes is severely limited by the low calorific value of the gas produced and the consequent high distribution costs. The Gas Research Board has worked upon several processes of total gasification that will yield a gas of high calorific value, and the work has gone almost as far as it can be taken at present in the laboratory. Of the possible processes, two lines of development have been selected for further examination on a larger scale. One of these is the carbonization of coal in hydrogen under pressure, whereby much of the carbon of the coal is converted to methane, and the heat so liberated is sufficient to complete the carbonization. This process would have to be stopped when about half the charge of coal had disappeared, as the reactive residue has to be gasified in steam and oxygen to provide the hydrogen required in the first stage. This second stage may not present difficulties of magnitude, but we are uncertain as to the practical difficulties that may be experienced in the first step, due to the plasticity of coal when heated with hydrogen under pressure. It is known that the caking power of coals is increased in the presence of compressed hydrogen, and it may be that we shall encounter difficulties in dealing with the coal as it passes through the plastic phase. I must add that there are a number of suggestions, many of them very ingenious, by which it is hoped that this difficulty can be avoided or surmounted, but only practical trial will show us whether they do give the right answer or whether this must be sought in other directions. The constituents of coal which give rise to this plastic phase will leave the reaction vessel to be condensed as a valuable primary tar. In laboratory experiments we have obtained substantial yields of this primary tar, which is particularly suitable for hydrogenation. As we should be producing hydrogen as part of the gasification process, the conversion of this light tar to motor spirit and other liquid fuels could well become an integral part of our coal processing.

The second group of processes which we are considering involve the gasification of coal in steam and oxygen, and the subsequent enrichment of the gas by methane produced catalytically. The caking properties of coal are likely to be less troublesome in this system, though they may not be without effect. This process could, however, certainly be operated to gasify coke resulting from carbonization by existing means. The catalytic synthesis of methane from hydrogen-carbon monoxide mixtures has hitherto presented many practical difficulties arising from the deterioration of the catalyst from one cause or another, but a closer study of the reaction has given reasonable expectation that these practical difficulties can be removed.

Laboratory work has shown that the theoretical principles of the processes are sound. I believe also that the processes will be found to be sound economically, but the real problems we have to face are essentially practical ones. I should like to be allowed to express our appreciation and thanks for the help and facilities afforded by the contracting firm and the gas undertaking upon whose works the exploratory plants are in course of erection.

It may be unnecessary to cite some of the advantages that will result from the successful application of one of these processes. There is the much greater range of coals that will become available to the Industry. Then, if coal can be converted wholly into gaseous and liquid products and there is no solid fuel resulting from its processing, and if the gas is generated at a pressure of about 750 lb. per sq. in., the practicability of long-distance gas transmission is greatly increased. It could well happen that the transmission of gaseous fuel might replace much of the handling and transport of coal from the mining districts—a step nearer the Russian ideal of the underground gasification of coal. The use of gaseous fuel in our towns and cities would mean the complete disappearance of atmospheric pollution. But I have already said much of these matters in other places.

You will rightly ask how quickly can these processes be brought to practical development. To such a question I would reply that it depends very largely upon the strength of the desire to achieve, and the intensity of the effort applied. I would advise you, as individuals, to watch the work the Gas Research Board is doing as closely as you can. Most gas undertakings are now members of the Board and, as representatives of such members, you are entitled to consult the Director, to seek suitable opportunities to see the work that is in progress, and to know all that has been done. Unfortunately, general publication of results is restricted at the present time, but if from what you learn you are inclined to agree with me that the prospect open to our Industry is immense and of such importance that delay cannot be tolerated, then it is you who must insist on more speedy progress. More money will be needed, though money alone will not ensure progress.

Really heavy cost will be incurred when the more fundamental studies are completed, and the time arrives for the exploratory work to be developed to the practical scale through which alone its potentialities and economics can be studied. This development may be beyond the resources of any single unit in the Gas Industry, and when the time comes the Industry will be invited to put its maximum co-operative effort to this project. In the meantime, I ask you to watch as thoroughly as possible the work that is being done.

Freedom to Develop

It may well be that I am now speaking of the *target for the day after to-morrow*. But all this is further evidence in a matter which is of vital importance to us. For the development and improvement of the gas-making process as we practise it to-day, as well as for the development of this chemical coal processing, it is essential that the houses of the future are built so that our Industry is free to develop. Once a house is built flues cannot be added, and it costs three times as much to install gas piping when a house is built as at the time of building. We must impress upon the Government, upon local authorities and others, the absolute necessity of providing the means to allow the free development of our Industry. In the great rehousing programme there is a unique opportunity, by the provision of suitable flues, a gas and electricity point in every room, &c., to encourage the future development of fuel technology—gas, electricity, and even raw coal. Failure to take this opportunity could retard the progress of fuel utilization for a generation at least. There are some who warn us that, as a nation, we cannot afford extravagances, and that we must in future be prepared to look carefully at every shilling. It depends upon what is meant by extravagance. It is a fact that, as each one of those new houses is built, the use of fuel in it will commence, and, if those 4 million new houses are designed for a life of 50 years, the money that will be spent on the fuel used in them will exceed three thousand million pounds. It is surely worth taking thought to see that so large a sum of money is well spent.

In conclusion may I say: In giving service to housing authorities and others we should avail ourselves of each other's experience. There should be a pooling of knowledge upon such matters as the nature and cost of installations, the terms upon which such installations are supplied, methods of charge, promotional tariffs and price structure. By such knowledge we may render the best service applicable to the particular conditions of our district. I believe we shall require in every region of the country a central organization that will be the co-ordinating brain-centre of that region—an organization to deal with the day-to-day problems of the gas-works and of the district of supply. This is no new idea; it is the development of the principle upon which is based the Industrial Gas Centres. *Such regional organizations will be necessary whatever may be the future orientation of our Industry.*

In the modified Britain that is being planned, our Industry has an immense task before it to see that we contribute our full share of service to the nation and to the community. Technical and commercial efficiency, whether in the gas-works or on our district of supply, will determine largely our ability to perform our task adequately.

"Gas Goes to War" is the title of a new educational display which will be seen shortly by members of the Forces all over the country. The display, which has been produced by the Gas Industry, consists of twelve pictorial panels in colour, each dealing with important wartime services of gas or coke. The use of gas in hospitals, munition factories and canteens; the heating of industrial premises; the work of the Gas Industry's trained Home Service advisers; and the domestic and industrial uses of coke, are some of the subjects dealt with. A final panel stresses the need for economy in fuel by the domestic consumer so that war demands can be met. Sixty sets of this display have been produced. Fifteen sets have been presented through the Women's Gas Council to the W.R.N.S., and a similar number respectively to A.B.C.A. for circulation to men and women in the Army, and to the W.A.A.F. Copies have also been given to the N.A.T.C.G.

Post-War Domestic Fuel Policy, with Particular Reference to South Wales*

By W. R. BRANSON, M.Sc., Assoc.M.Inst.C.E., Cardiff

IN his Presidential Address to the Institute o Fuel(1) Dr. E. W. Smith ended with a summary, of which I should like to quote the first five points. They were:

1. Fuel is not only important to the future prosperity of this country, but it is of vital importance.

2. It is believed that its problems should be studied from the point of view of the heat, light, and power requirements of the community, rather than with the object of increasing the consumption of coal.

3. The problems of each industry—coal, gas, coke, and electricity —should be studied separately and solved as far as possible prior to bringing about any closer integration.

4. The study of improved methods of using fuel and power of all kinds with the object of conserving coal is of first importance.

5. Research should be increased and co-ordinated, but the lessons of researches already reported should be more fully applied.

Pre-War Domestic Fuel Consumption

To estimate the extent of the problems of domestic heat supply it seems desirable first to see what were the pre-war consumptions of the various fuels in this field, and then to estimate the probable future demand.

Statistics are unfortunately inadequate, and at best only an estimate can be given of pre-war consumption. Numerous estimates have been published, of which those of C. A. Masterman(2) and Dr. H. Hartley(3) may be mentioned. Tables I and II are based largely on similar tables in Masterman's Paper more recent official figures being used where available.

Table I shows the total consumption of each of the various fuels used for domestic purposes, the thermal equivalents of these quantities and the useful therms obtained from each, assuming certain given values for efficiency in use. In Table II these figures are extended to show the average consumption per household of each of the fuels and the useful heat obtained therefrom. In these tables, apart from the use of more recent figures, the principal differences from Masterman's are that the proportion of total coke sales used domestically has been taken at a lower figure (40%, instead of 67%), and that the efficiency in use of gas is taken at 45% instead of 50%. In view of the fact that about half the gas sold for all purposes is used in domestic cookers, of which many old types are still in use, it is felt that even this figure may err on the high side. Figures published by S. J. Beale(4) for the U.S.A. are included in Tables I and II for comparison with the British figures. The following points may be noticed:

1. While raw coal, excluding anthracite, provides about 57% of the useful heat in British houses, in the U.S.A. this percentage is only 39 (Table I, cols. 9 and 10).

2. The efficiencies in use in the U.S.A. are much higher than in this country, chiefly due to the absence of the open fire. Beale's figures may err on the high side, but not to such an extent as to invalidate this conclusion. (See Beale's letter to "GAS JOURNAL," Dec. 22, 1943, p. 775.) (Table I, cols. 5 and 6.)

3. The useful heat per household is roughly three times as great in the U.S.A. as in Great Britain. This may be due in part to the greater severity of the American winter, particularly in the more densely populated north and east, and in part to a national liking for higher indoor temperatures. This difference cannot, in my opinion, be entirely unconnected with a higher standard of living, which demands continuous warming in the winter of rooms which in this country remain unheated for the most part. An increase in the average income of consumers in this country would probably do more to increase domestic sales of the higher priced fuels than would more attractive terms for the sale or hire of appliances. This view is supported by the increase in sales of gas to slot consumers since the commencement of hostilities, despite Ministerial appeals for economy.

4. The total fuel used before the war in Great Britain per household (Table II, col. 1) was equivalent to approximately 4.1 tons of coal, a total for the whole country of about 50 million tons used for domestic heating purposes.

* Paper to the Wales and Monmouthshire Junior Gas Association.

TABLE II.—PRE-WAR FUEL CONSUMPTION PER HOUSEHOLD IN GREAT BRITAIN AND U.S.A. CALCULATED FROM COLUMNS 1, 2, 7, AND 8 OF TABLE I, ASSUMING 12.1 MILLION HOUSEHOLDS IN GREAT BRITAIN* AND 29.9 MILLION IN U.S.A.

	Fuel per household.		Useful therms per household.	
	Great Britain.	U.S.A.	Great Britain.	U.S.A.
Column number	(1)	(2)	(3)	(4)
Gas	100 therms	200 therms	45	120
Electricity	205 units	500 units	5	13
Coal and coalite	0.37 tons	0.25 tons	27	36
Anthracite	0.12 „	1.0 „	10	150
Fuel oil and kerosene	0.04 „	0.77 „	7	110
Coal	2.8 „	2.1 „	124	276
Total	...	...	218	705

* *The Home Market*, 1939, estimates the number of households in Great Britain in 1937 as 12,115,000.

Estimated Post-War Demand in New Dwellings

Turning now to estimate the probable fuel requirements in new houses built as part of a national rehousing programme, Table III has been prepared to show the heat requirements for various purposes and the quantities of fuel needed to meet them. The type of house considered is such as may be expected to be built in large numbers for artisan occupancy, which would probably contain one living room, kitchen—which might be used for consuming meals—and three bedrooms. It is assumed that the average household would consist of approximately four persons. A rise in the birth-rate may lead to a demand for larger houses, but such rise would be unlikely to affect the average size of household for some years, and it is considered that the re-building programme, which will extend over at least a decade, could be adjusted in its later years should this demand eventuate. The useful therms required (col. 1 of Table III) show an increase of approximately 30% over pre-war usage, indicating the higher standard of comfort attainable. Even so a rise in hygienic standards leading to a demand for a really continuous hot-water service would easily double the hot-water requirement indicated in the table, provided consumers were in a position to pay for the fuel used. Central heating of rooms not in regular occupation would also lead to big increases in demand for space-heating. A more probable and economical method of increasing comfort would be to make increased use of thermal insulation in post-war building. It should also be noted that refrigeration has not been included. This would require the supply of about 50 therms of gas, or a further 10%.

Table III includes only a few of the possible combinations of appliances; all those considered would give a completely smokeless service. A reduction in atmospheric pollution may result from the use of the improved coal-burning appliances promised by B.C.U.R.A.,

TABLE I.—ESTIMATED PRE-WAR DOMESTIC FUEL CONSUMPTION IN GREAT BRITAIN AND THE U.S.A. (*a*) (EXCLUDING LIGHTING AND POWER).

	Total pre-war annual consumption. Millions.		Equivalent therms. Millions.		Estimated efficiency in use.		Total useful therms obtained. Millions.		Percentage of total useful therms.	
	Gt. Britain.	U.S.A.	Gt. Britain.	U.S.A.	Gt. Britain.	U.S.A.	Gt. Britain.	U.S.A.	Gt. Britain.	U.S.A.
Column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Gas	1,200 therms (*b*)	5,980 therms	1,200	5,980	45%	60%	540	3,600	20.7	17.0
Electricity	2,500 units (*c*)	15,000 units	85	510	75%	75%	64	382	2.3	1.8
Coke and coalite	4.5 tons (*d*)	7.5 tons	1,310	2,185	25%	50%	327	1,092	12.4	5.1
Anthracite	1.5 „ (*e*)	29.9 „	500	8,987	25%	50%	125	4,493	4.6	21.3
Fuel oil and kerosene	0.5 „ (*f*)	23.1 „	242	9,950	35%	33%	85	3,283	3.1	15.6
Coal	33.5 „ (*g*)	62.4 „	10,000	18,340	15%	45%	1,500	8,253	56.9	39.2
Total rate	...	...	13,337	45,952	20% average	46% average	2,641	21,103	100.0	100.0

(*a*) All U.S.A. figures in columns 4 and 6 from "Gas Fuel in Post-War Planning," by S. J. Beale, "GAS JOURNAL," Oct. 13, 1943, p. 454, and relate to figures for 1940. The electricity consumption has been taken at 60% of Beale's figure to allow for lighting and power consumption.
(*b*) 80% of total gas sold. B.O.T. return relating to authorized gas undertakings in Great Britain for 1938. H.M.S.O., 1940.
(*c*) 60% of electricity sold to electricity consumers. Electricity Commission Return relating to authorized undertakings, 1937-38. H.M.S.O., 1939.
(*d*) 40% of coke sold for inland consumption (excluding coke for blast furnaces). 18th Report of the Secretary for Mines for the year ended December 31, 1938. H.M.S.O., 1940.
(*e*) 60% of anthracite sold in Great Britain, 18th Report of the Secretary for Mines for year ended Dec. 31, 1938. H.M.S.O., 1940.
(*f*) 10% of imported fuel oil and 35% of imported kerosene retained for home consumption, 18th Report of the Secretary for Mines for year ended Dec. 31, 1938. H.M.S.O. 1940.
(*g*) Estimated (various sources).

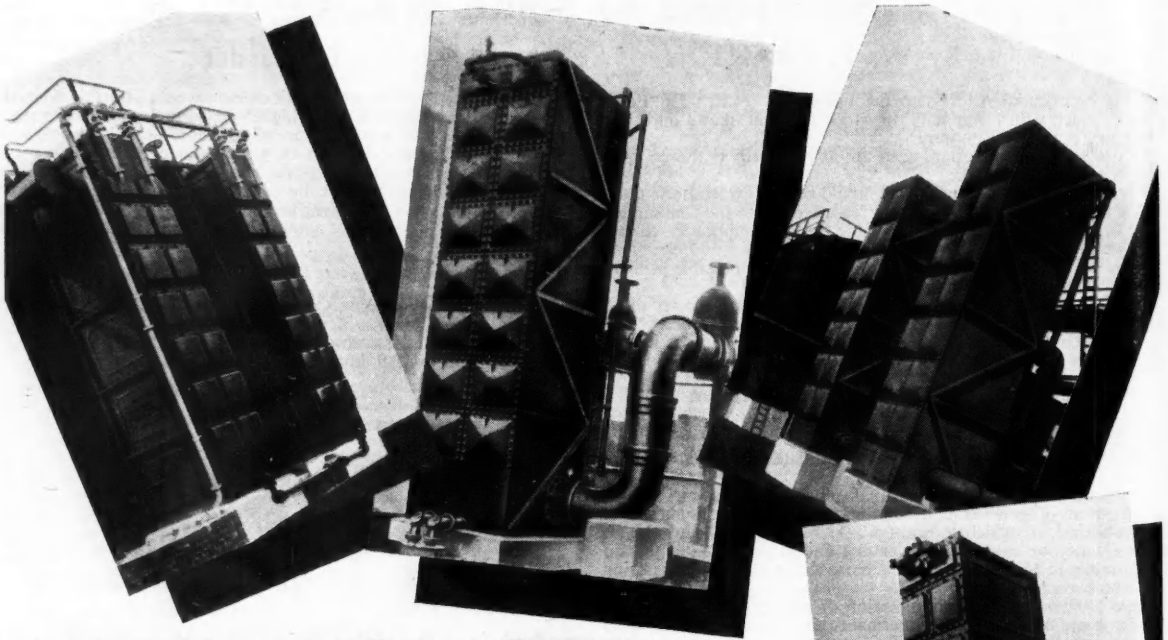

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TABLE III.—Estimated Annual Fuel Requirements of Artisan Household of Four Persons in Post-War Home.

	Useful therms required.	Fuel needed to supply useful therms required. Gas (therms).	Electricity (K.W.Hs.).	Solid smokeless fuel (cwt.).	Gas for all purposes except living-room fire. Gas (therms).	Solid fuel (cwt.).
Column number	(1)	(2)	(3)	(4)	(5)	(6)
Cooking	40	80 (*a*)	1,600	26	80	...
Water heating	100 (*b*)	200	4,000	28½	200	...
Space heating	120	200	4,000	27½	...	27½
Sundries (laundry, &c.)	20	40	800	...	40	...
Total	280	520	10,400	82	320 (*c*)	27½
Cost per annum (fuel only)	...	£19 10s.	£43 6s.	£10 5s.	£15 8s.	
Cost per week	...	7s. 6d.	16s. 8d.	3s. 11d.	5s. 11d.	

Fuel consumptions are based on the efficiency of the best appliances likely to be available at the end of the war.
The following prices have been used in calculating costs: Gas at 9d. per therm; electricity at 1d. per unit; solid fuel at 50s. per ton.

(*a*) Based on Good Housekeeping Institute Tests, 1933, which gave 0.4 therms per person per week.
(*b*) This figure would allow 1¼–2 baths per person per week in addition to a fairly liberal allowance for general household purposes.
(*c*) *cf.* British Gas Federation Report on Post-War Planning, para. 40, which gives an estimate of 350 therms and 30 cwt. of coke.

TABLE IV.—Effect of Various Fuel Policies on Total Annual Demand for Prepared Fuels and for Raw Coal.

	All gas.	All electric.	All solid smokeless fuel.	Gas with solid fuel fire in living room. Gas.	Solid fuel.
Estimated consumption in 500,000 new households (from Table III)	260×10^6 therms	$5{,}200\times10^6$ units	2.05×10^6 tons	160×10^6 therms	0.69×10^6 tons
Less average pre-war consumption of 500,000 households (from Table II, col. 1)	50×10^6 ,,	102.5×10^6 ,,	0.25×10^6 ,,	50×10^6 ,,	0.25×10^6 ,,
Net annual additional demand	210×10^6 ,,	$5{,}098\times10^6$,,	1.80×10^6 ,,	110×10^6 ,,	0.44×10^6 ,,
Percentage annual increase on pre-war consumption for all purposes (*a*)	14%	26.5%	13.25%	7.3%	3.1%
Coal required to produce estimated consumption in line 1 above—million tons (*b*)	3.25	3.48	2.05	2.00	0.69
Coke for sale produced from above coal—million tons	1.625	*Nil*	*Nil*	1.00	*Nil*
Net coal consumption—million tons	1.625	3.48	2.05	1.69	
Total pre-war domestic consumption of all fuels (Table II, col. 1) as equivalent coal—million tons	2.05	2.05	2.05	2.05	
Net change in consumption of coal for all purposes—million tons	−0.42	+1.343	*Nil*	−0.36	

(*a*) Coke for blast furnaces excluded.
(*b*) It is assumed that the yields of gas and coke in new plants would be 80 therms per ton and 10 cwt. per ton, and that the coal used in electricity generation would be 1.5 lb. per unit *sold*.

and these appliances may prove more economical than those in general use before the war. It is unlikely, however, that a complete heat service can be offered by solid fuel appliances involving a smaller consumption than the 4.1 tons given in column 4 for smokeless solid fuels such as coke or anthracite.

It has been estimated that there will be a total deficiency by the end of the war due to bomb damage, cessation of building during the war, and increase in the number of families, of about 4 million dwellings. During rebuilding, obsolescence of other houses will continue, and it seems not unreasonable to assume that if it were intended to replace the shortage in a ten-year period, an annual programme of about 500,000 dwellings would be necessary. Table IV has been prepared to show the effect of such a programme on the total consumption of each of the various fuels, assuming any of the alternative systems considered in Table III were adopted exclusively in all new buildings. It will be seen that the figures in the first line of Table IV are obtained by multiplying the totals in cols. 2 to 6 of Table III by 500,000. From the figures so obtained the pre-war consumption of each of the fuels in 500,000 households (Table II, col. 1, multiplied by 500,000) has been deducted to give the net estimated increase in demand. This is equivalent to assuming that the total number of households in the country will remain unchanged, and this, of course, is not accurate. It is considered, nevertheless, that it is a much nearer approach to the facts than the alternative, which was to assume that post-war business would represent entirely new demands for fuel services. It should, however, be borne in mind that the percentage annual increase in demand shown in line 4 of Table IV is probably an under-estimate. Each of the alternatives considered in Tables III and IV may now be briefly discussed.

The objections to the exclusive use of gas, electricity, or solid smokeless fuels may be summarized as follows:

1. *All Electric.*—The all-electric house may be ruled out for the following reasons:

(*a*) The cost would be beyond the means of all but the wealthiest (Table IV, col. 3).

(*b*) There would be a net annual increase of nearly 1.5 million tons in the coal consumption, since at the end of the 10-year rebuilding programme the total coal used for domestic purposes would have risen from about 50 million tons to about 65 million tons.

(*c*) Expansion at the rate of 26.5% per annum in the electrical output would involve capital expenditure of approximately £45 million per annum (at pre-war prices) on generating plant alone, assuming the load factor remained unchanged. It is doubtful if growth at such a rate is possible in view of the many other calls on labour and materials.

2. *All Gas.*

(*a*) While at 7s. 6d. per week an all-gas service would be within the reach of many, supply at such a price involves the assumption that the cost of gas-coal is not increased or the revenue from coke decreased to such an extent that the savings due to the reduction in overheads and consumer costs are not more than cancelled out. It is extremely doubtful whether an additional 25 million tons per annum of gas coal could be purchased and 13 million tons extra coke sold without seriously affecting the pre-war relative price levels of coal and coke and thus increasing gas-making costs. This would be the position at the end of a 10 years' programme.

(*b*) While the annual capital expenditure on gas manufacturing plant would be less than that for electricity production, yet it would amount to not less than £15 million at pre-war prices. An increased output of 210 million therms per annum, allowing for the reduced load factor involved in supplying the space heating demand, would require plant roughly equivalent in capacity to the whole of the works of the Gas Light & Coke Company to be built each year. Bearing in mind the demand which is certain to be experienced for other buildings, it is doubtful if this is within the capacity of the gas-contracting business.

The successful development of a complete gasification process would avoid the economic difficulties involved in increasing coal purchases and coke sales. The difficulty of expanding production at the rate envisaged would, however, remain. If such a process could produce gas at as low a cost into holders as the best pre-war carbonizing plant, the increased consumption per consumer should enable an all gas service to be offered at less than 6s. per week.

3. *All Solid Smokeless Fuel.*—In the absence of very large new demands for gas for industrial purposes, coke production could not cope with a demand increasing at the rate of 1.8 million tons per annum for 10 years, and anthracite output pre-war was only some 6 million tons.

We may therefore dismiss these three solutions as impracticable by themselves. This is not to say that, where the slight extra expense is not an obstacle, the all-gas house should not be advocated, provided corresponding outlets for the coke produced are energetically sought simultaneously with gas selling. The all solid fuel house may also have some appeal where cost is a vital consideration if satisfactory cheap appliances can be developed. These would probably supply hot water and space heating simultaneously. Such an arrangement however would certainly not be labour-saving, and would do little or nothing to promote coal conservation.

4. *Gas and Solid Smokeless Fuel.*

We come therefore to consideration of the most practicable alternative immediately available—namely, gas cum-coke (or other smokeless solid fuel). In running cos it is only slightly above the generally recognized pre-war expenditure on domestic heating—*viz.*, 5s. per week.

While not completely labour-saving it i a considerable advance on most pre-war arrangements in working-class houses A very definite

contribution to coal conservation would be made by the displacement of the coal fire for one with about double its efficiency. In addition the often expressed preference for an open fire would be met.

Considering this solution of the domestic fuel problem from the point of view of the Gas Industry, it has an attraction in that the addition of the water-heating load would assist in raising the annual load factor and in reducing capital costs. The necessary expansion in production plant, though very considerable, would probably be within the capacity of the contracting side of the industry provided new development did not proceed simultaneously in every undertaking's area. Prices of coal and coke being assumed to remain unchanged, the improved load factor and increased consumption per consumer should lead to a reduction in the price of gas which would enable a total fuel bill of 5s. per week to be achieved.

The crux of the problem, however lies in the attitude of the consumer, and it may be asked whether the public are prepared to accept gas for water heating and coke for space heating.

To the first part of this question I believe the answer lies largely in sulphur removal. Gas can provide a very satisfactory hot-water service to-day, but only at considerable expense in maintenance where gas containing upwards of 20 grains per 100 cu.ft is supplied. Unless maintenance is provided on a really adequate scale the consumer will soon be dissatisfied, and frequent service calls are likely to be regarded as a nuisance. Before a gas-coke policy on these lines can be wholeheartedly advocated by any gas undertaking, I believe sulphur must be removed almost completely. Coke for the open fire demands for success the right appliance and the right fuel. The former I believe is likely to be available after the war. Manufacturers are giving to the design of these fires a great deal of thought, and the public will have a wide choice of satisfactory models as soon as labour and materials become available for their manufacture.

The provision of the right fuel is not so simple a matter and I believe is much further from solution. In order to produce coke of an ash content not exceeding 7 to 8% it is necessary to carbonize coal containing less than 5% of ash, and I believe that an approach will have to be made to the coal producers by the Gas Industry on a national scale in order to secure the installation of adequate coal-cleaning plant, It will have to be recognized that such plants involve considerable capital expenditure, the cost of which must be borne by the purchaser of coal. The proposals for the cleaning of coal to an ash content of about 2% which have been put forward by Dr. Lessing(5) deserve careful consideration in this connexion. Provided clean coal were available, proper attention to quenching and well-designed and maintained cutting and screening plants would allow a satisfactory open fire coke to be prepared from the majority of coals used in gas-works, especially where carbonization is carried out in continuous vertical retorts.

There remains, however, a further objection to the gas-coke combination considered. This lies in the fact that it is impracticable to produce coke of No. 2 size (frequently referred to as broken coke) without the simultaneous production of a large proportion of No. 3 and No. 4 sizes and breeze. In the most up-to-date installations of vertical retorts the fuel consumption of the producers, if designed to that end, would absorb the screenings through, say, 1 in. or 1¼ in. from run-of-retort coke, while waste heat steam would provide practically all power and process requirements except where pumping of gas for distribution is necessary on a large scale. Thus there is little outlet on the best designed works for the smaller sizes from the coke-grading plant. Unless these sizes can be sold for domestic purposes they will be competing with the low-priced small coals used in industry, and revenue would be severely affected. It would consequently be necessary, in order to achieve a satisfactory balance between gas and coke production, to sell an appreciable quantity of the No. 3 size coke (nut coke) for domestic hot-water boilers, thereby reducing the potential gas load.* Yet another objection to the gas-coke combination is that whereas coke would be produced throughout the year, the sales would be limited to about seven or eight months per annum, and this would necessarily involve considerable stocking and handling costs and attendant breakage and breeze production.

Summarizing the foregoing it may, I think, be stated that no single solution of the domestic fuel problem in the immediate post-war years appears practicable, and it is certain that differing solutions will be adopted as determined by local conditions. Nevertheless the use of coke in the open fire with gas for all other heating purposes is, despite numerous complications, the most immediately practicable. In order to ensure adoption of this alternative to the maximum extent the Gas Industry must—

1. Spare no effort in endeavouring to find the most economical solution of the problem of complete sulphur removal.
2. Tackle energetically the question of purchasing coal as free from ash as is economically possible.

The foregoing considerations apply with greater or less force to all undertakings in the country, being modified in some districts by very large industrial gas loads or by the prevailing prices of competing fuels. In the remainder of this Paper I want to turn from a general study of the national position to a more particular enquiry into conditions in South Wales.

* A possible outlet for nut coke which would not involve competition with gas for the water-heating load is for use in closed stoves. These have never become popular in this country, but they are at least twice as efficient as most open fires, and would have some of the advantages of central heating.

Domestic Fuel in South Wales

South Wales is the only British source of really high quality anthracite, and a very large quantity of other coal is available which is almost, if not quite, smokeless. Smoke abatement cannot, therefore, be advanced as a principal argument for the use of gas and coke in Welsh homes. High and medium volatile coals are, however, used in South Wales for household purposes. Due to the proximity of the population to the coalfield, the prices ruling for coal in South Wales are much below those in areas such as London and the South-Eastern Counties. The quality of the higher volatile coals available in the area are not such as to enable gas-production costs, by existing methods, to be as low as in areas where coals more suited to gas manufacture are within easy reach. The competition in price to be faced by both gas and coke is consequently at least as severe as in any area in the country. In spite of the labour involved there is a strong local tradition in favour of the open fire and back boiler, which will require much educational effort—and probably also the inducement of a financial saving—to overcome. In many South Wales districts miners obtain coal free or at reduced prices. These facts are reflected in the sales of gas in the area.

In 1938 the average sales per consumer of the 48 authorized gas undertakings in Monmouthshire, Glamorgan, Brecon, Carmarthen, and Pembroke was only 82 therms as against an average for England and Wales of 133.7 therms and for Scotland of 125.4 therms. This low consumption was due in part, no doubt, to the depressed state of industry in the area, and not entirely to the factors enumerated above. If South Wales is allowed to fall back in time of peace into the state of depression from which it was rescued by the war, then the chances of a prosperous Gas Industry in the area are remote. I believe, however, that this will not be allowed to happen, and that a real effort will be made to broaden the industrial base by the introduction of new industries and the retention of others which have been brought into the area during the war. The Gas Industry has an important part to play in the industrial development of the area—a subject outside the scope of the present Paper—and has simultaneously to develop the sale of its products in the increased domestic market which greater industrial prosperity will certainly open up.

The smallness of pre-war consumption is in fact a measure of the greatness of the opportunity for growth in the post-war years. In dealing with Great Britain as a whole, it has been shown that the general adoption of a gas-coke combination in new housing would result in an increase of over 70% in gas sales in 10 years. Assuming re-housing in Wales is carried on at the same proportionate rate as in the rest of the country, the gas consumption would be more than doubled under the same conditions.*

Increases in gas output of this order are not likely to occur without a real effort on the part of the Industry, and one of the first desiderata will be a supply of cheap gas.

Coke Oven Gas in South Wales

It might be thought that in the industrial area of South Wales a simple solution may lie in the use of coke-oven gas surplus to requirements at the ovens. Such a possibility is referred to with some optimism in the *Second Industrial Survey of South Wales*.(6).

Many undertakings in the area already purchase surplus gas, as is shown by the figures for 1938 quoted below from the Report of the Secretary for Mines:

Coke Oven Gas Production and Disposal in South Wales and Monmouthshire, 1938.

Total coke oven gas made	18,661.8	mill. cu.ft.
Used for heating ovens	8,929.7	,, ,,
Used for all other purposes	7,040.5	,, ,,
Sold to gas undertakings	1,218.5	,, ,,
Sold to other independent undertakings	730.6	,, ,,
Balance	742.5	,, ,,

The quantity of coke-oven gas sold to gas undertakings in 1938 represented some 20% of the total gas made and purchased by authorized undertakings in South Wales. Were more recent figures available it would probably be found that most of the balance of surplus gas is now put to good use. Further, very large quantities of gas could be released for town use if the coke-oven gas at present used at collieries for firing boilers and similar plant were replaced by coal. Unfortunately this use of gas is greatest in those ovens unassociated with iron and steel works, and situated on the coalfield at some distance from the large centres of population. In many cases these ovens are of old design and, unless they are to be reconstructed, some of these plants may be closed down after the war. There would then be a considerable reduction in the quantity of gas which could be made available for public supply. Nevertheless, surplus gas should certainly be used for town purposes where the situation of the ovens is conveniently near to a centre of population, provided a reasonably long-term guarantee of supply can be assured.

* The output from the South Wales Coalfield of coal containing over 30% of volatile matter was probably over 3 million tons pre-war, of which only about 300,000 tons was used by the Gas Industry. There should, therefore, be little difficulty in obtaining supplies of coal adequate for such an increase in gas sales, though a higher price might have to be paid for the extra coal which had previously been sold in the domestic market.

The bulk of the demand for gas in South Wales is concentrated in two main areas, one in the west of Glamorgan embracing Swansea, Neath, Port Talbot, Llanelly, and a number of smaller undertakings, and one in the east including Newport, Cardiff, and Barry. Recent industrial developments show no sign of leading to any change in this concentration, but rather tend to increasing growth at the ends of the coastal plain.

The most immediately practicable means of achieving the economies of centralized manufacture would therefore consist in the supply of each of these areas from a single modern station, augmented by surplus coke-oven gas where available.

Presuming concentration of gas manufacture at a few points were decided upon, it does not necessarily follow that coke-ovens would produce the cheapest therm. R. W. Hunter[7] showed some years ago that with the same coal and coke prices the coke-oven cannot produce gas at a lower price into holder than modern intermittent or continuous vertical retorts.

The latter would have advantages in their greater flexibility under varying loads while the coke produced would be more suited to the domestic market, a market less liable to violent fluctuations than the iron and steel trade.

It must be remembered that the purchase of coke-oven gas does not relieve a gas undertaking from its statutory liabilities as to continuity of supply, calorific value, and purity, so that, in many cases where coke-oven gas is purchased, standby plant is maintained at the gas-works.

(*To be continued*)

Benzole Recovery by Activated Carbon*

By R. WALKER, H. C. APPLEBEE, A.I.C., and A. K. HOWELL,

Manchester Gas Department

(*Concluded from p. 346*)

The concentration of HCN in the purified gas at Rochdale Road is relatively low, amounting to only a few grains (3–7) per 100 cu.ft. Approximately half of this is removed by the benzole plant, and is subsequently found in the water condensate from the steaming out of the adsorbers. This solution is a probable source of corrosion, as indeed it has proved to be in our case. The brass mechanism of the condensed-water meter was rapidly eaten away, and the relatively rapid corrosion of the condenser tubes, to which reference is made later, was no doubt accelerated, if not initiated, by the circulated cooling water which contains, as has been said, the water condensate from the benzole condensers.

Since at best this condensate can only be a potential source of trouble, and its quantity is relatively small, it is certainly desirable that it should be rejected, the small make-up required being supplied by fresh town water.

Experience in the Operation of the Plant

When the plant was first started there were no difficulties. In fact, except for a few weeping joints, no attention was required for 10 days, apart from lubrication. But the plant had to be shut down after 10 days, to remedy a fault which had developed in the condensate-ejector pump motor, and the opportunity was taken of fitting a steam ejector in case the motor broke down again, of patching a crack in a faulty casting, and of fitting thermometers in the water circuit.

After a run of 37 days benzole commenced to "break through" the carbon, and the cycle was reduced from 120 to 80 minutes. Four days later it was found that the quantity of cooling water was insufficient. The fault was traced to silt (mainly builders' rubble) which had been washed down the tower, and had fouled the foot valve on the water pump suction. To remove the obstruction entailed shutting down the plant, pumping away the water, cleaning out the sump, removing and cleaning the foot valve, and, before the plant was restarted, refilling the water tower and re-priming the pump.

A small water leak in the bottom of the gas cooler had by this time developed to such an extent that attention was essential. Grouting with cement round the cooler base was tried without success. The cooler had to be disconnected from the gas mains, and jacked up in order to reach the leak, which was found to be due to loose studs in the bottom of the cooler. These studs had to be removed and washers fitted before the leak was cured. It was then found to be very difficult to remake the joints on the gas main, since when the cooler was lowered back into position, it was found to be impossible to "spring" the gas mains apart to allow the insertion of jointing between the cooler and gas main flanges. Finally, jointing was placed round the edges of the flanges, and steel bands clamped round to hold the jointing in position.

The brick water-cooling tower was also found to be unsatisfactory. The bricks, being porous, allowed water to soak through from the inside, and to run down the outside walls. This necessitated a further shut down, and the old oil plant was brought into operation again to avoid loss of benzole. All the board filling in the tower was removed, and the inside of the tower was thickly coated with cement by blowing it on in a semi-dry condition, with compressed air. This, of course, altered the inside dimensions, all the board filling having to be recut before replacing.

While this was being done, the carbon in the adsorbers, which had settled to the extent of 6 to 9 in., was topped up, and flame-proof switches and lighting were installed.

Only one further hitch occurred during the life of the first batch of carbon. A broken spring in the compressed air relief valve, by lowering the air pressure, allowed the automatic gas valves to open out of turn.

Hydrocyanic acid was detected in the condensate from the steaming of the adsorbers as soon as the plant was started, and quite early afterwards there were signs of trouble. A water meter and two brass valves were quickly found to have been badly corroded. When the second batch of carbon was put to work it was found that the condensers were not giving adequate cooling. The condenser plates were removed and it was then found that the water tubes were blocked with a soft brown sludge, which on analysis proved to contain iron oxides and cyanides. After cleaning, the condensers were put to work again, and it then became apparent that some of the water-tubes were leaking badly owing to corrosion. Ultimately all the condensers had to be retubed.

The water at each stage of the system was examined, with the following results:

Town water	pH value 7.0
Condensed steam . . .	,, 5.9
Condensate from adsorbers .	,, 5.8
Circulating water . . .	,, 6.7

As the circulating water is continually aerated during its passage down the cooling tower, it has been decided to treat it with tannin phosphate and an alkali to maintain a pH value of 9.0. As the condensate from the adsorbers was more than sufficient to make up the losses of water by evaporation, &c., there was a constant overflow to waste. This made the water treatment wasteful, and since the quantity of make-up water required is small, it was also decided to reject the condensed water from the adsorbers and to make-up with town water.

The effects of the water treatment are not yet apparent, as it has been in operation for too short a time.

As a result of our experiences with the plant we are able to offer certain suggestions which in our opinion would make for better and easier working. This is not to say that the plant has not given satisfaction ; on the contrary, we have been very pleased with its performance. The plant is almost fully automatic, requiring but little attention, it is clean, the benzole is of good quality, the percentage recovery of benzole may be very high (although this, of course, depends on the conditions under which the plant is operated), and the costs are at least comparable with those for the oil-washing process.

The faults with which we have had to deal are not inherent to the activated carbon process, and we are of opinion that our suggestions would overcome most of them.

The suggestions, then, are as follows:

(1) A horizontal gas cooler—or cooler of other convenient design—of adequate size would facilitate examination and retubing if and when required.

(2) Large drains should be fitted to gas mains, with visible overflows from syphons, so that possible water leakage into the mains would be readily detected.

(3) There should be no copper or brass fittings in the condensed water system.

(4) Synchronized drive for the two valve operating boxes would be an advantage in keeping the two sets correctly in phase with each other.

(5) A steam meter should be supplied as an integral part of the plant.

(6) Larger benzole condensers are necessary.

(7) All valves should be so placed as to give easy access.

(8) Mechanical means of emptying and refilling the adsorbers with carbon would be a very great advantage.

(9) Some means of determining when benzole has ceased to flow from the condensers, so that steam might be adjusted accordingly, would help in steam economy.

(10) Thermostatic control of the steam supply to the gas heater would be of assistance.

(11) Automatic operation of the cooling water supply to the benzole condensers would be an added refinement.

(12) Where, as in our case, the benzole storage tanks are above the level of the benzole measuring tank, &c., non-return valves should be fitted as necessary to prevent syphoning.

(13) The water condensate from the steaming of the carbon should be rejected.

Finally, we would say that the possibilities and importance of post-war demands for liquid fuels, and, indeed, of other products, make it of the utmost importance that critical examination should be given to any process which may contribute to the satisfaction of those demands, with profit to both the Gas Industry and the consumers.

* From a Paper to the Manchester and District Junior Gas Association.

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COMPANY MEETING.

Brighton, Hove, and Worthing Gas Company

The Annual General Meeting of the Brighton, Hove, and Worthing Gas Company was held on March 17 at 5, Great Winchester Street, E.C. Mr. A. M. Paddon, M.Inst.C.E. (Chairman of the Company), presided.

The Secretary (Mr. G. Murray Burton, M.A., F.C.A.) read the notice convening the meeting.

The Chairman said: You will be aware of the conditions in which this meeting has to be conducted and the limitations imposed upon us by the appropriate Minister. We have been unable to circularize the accounts, and I cannot give you any detailed information with respect to them. They are available for you to inspect if you comply with the necessary conditions, and the Directors would be very pleased if you did take the trouble to acquaint yourselves with them. It is putting you to a certain degree of inconvenience, and I do not suppose that very many will take advantage of the opportunity so afforded, but I can tell you that the dividends which we advise you to declare to-day have been arrived at after all due appropriations have been made. Beyond that I am not at liberty to go, but I can say this—that the undertaking is in at least as good condition as it has been, and that we have every reasonable prospect of being able to deal with any future difficulties.

The measure of success which is recorded in our report and in the accounts has not been achieved without very considerable sacrifice and devoted service on the part of our workmen and our staff generally. All undertakings are exposed to one common danger in these days, but a larger measure of risk and hazard attaches to those upon the South Coast, immediately facing the danger which emanates from the Continent, and therefore I think that a greater measure of recognition and thanks should be accorded to those who have carried on the business in these very difficult conditions. The results achieved are not only due to what I might call technical care and excellence, but are also due to the fact that they have been achieved in intermittent difficulties and vicissitudes exacting the very last degree of effort from all concerned. I am sure you will all appreciate what the Company and the proprietors owe to their staff at Brighton, and in similar towns on the South Coast. I can say nothing as to what our prospects are for business, because they are qualified in the way to which I have already referred.

Departing from the purely domestic aspect of matters, I might here say a little about the Gas Industry in general. I would not do so but for the fact that certain policies and certain suggestions are very prominent nowadays as to how the Industry should be conducted, or should conduct itself, in the future. They find expression in a very common form of activity nowadays called "planning for the future," which is a matter for which I cannot acquire any great sympathy, because it seems to me to formulate definite ideas and purposes upon indefinite premises, which is a very unwise thing to do. A very great statesman once said that more mistakes were made by premature anticipation than by any degree of dilatoriness, and I think it is not hard to understand what he meant.

If people will try to climb hills before they come to them, they are apt to encounter surprises when they arrive at their objective. You may say, "How does this apply to the Gas Industry?" Well, the Gas Industry has been involved in what I may call the *rabies mutandi*, and all sorts of suggestions have been made as to our future. One is that we have been hitherto subjected to legislative restrictions which are anachronistic and should be done away with. I will just say that statutory regulations and restrictions, although they do impose limitations, also afford a very great measure of protection, and that seems very largely to have been lost sight of.

Another school of what I may call consultants, who have not been consulted but who wish to be, have pointed out that we should in future endeavour to reconstitute ourselves upon what is called the "basis of integration." I can only say that that process, to my certain knowledge, has been in existence for the last 50 years—and I can speak personally for 50 years—and in so far as it has any beneficial and economic advantage it has always been given effect to. It means the assimilation of one undertaking into another where mutual co-operation promises beneficial results.

This has gone on for years, but if it is to be adopted as a blind perfunctory policy of compelling different undertakings to be merged in each other without their mutual consent or without the justification of economic conditions, then I think it promises a very large measure of disaster. It must be remembered by those who are so anxious to reconstitute the relations between the Gas Industry and the Government that already the Industry is under almost every form of practical regulation at the present time, and has been for at least 100 years. We are regulated in regard to the prices of the commodity we sell, as to the quality of what we sell, as to the amount of capital we can put up, and as to how that capital shall be provided. We cannot acquire land, property, or other things necessary for our undertakings as any free trading corporation does. All these matters have been the subject of wise restriction, carefully thought-out legislation, and I cannot think that the extension of this control can be of any possible benefit either to the Industry or to the consumer of gas.

There is a very great difference between statutory regulation and nationalization, and I cannot help thinking that many of those who advocate a rather more active programme with regard to legislation have as their ultimate object nationalization. That is a thing which cannot constitute any improvement upon what we call statutory regulation, because it is not subject to revision from time to time as the legislation with regard to the Gas Industry is. It is not adaptable to the particular circumstances or conditions of the different parts of the Gas Industry, because there is very little in common between the supply of gas in the North of England and that in the South of England. Each of these great centres of distribution requires intelligence, experience, and specialized attention if they are to have the particular form of legislation which will promote the mutual interests of the undertakings and of the public at large. They will never get that under nationalization, but it is enjoyed at present.

Those are the things which are on the horizon; we cannot see how they will develop, but I felt it advisable at this time to point out that the promise of all this future political and social activity is not fraught with anything like the benefits ascribed to it by those responsible, and I hope the Gas Industry generally will approach the whole subject of rehabilitation with the utmost care and circumspection.

The Chairman then moved the payment of the final dividends recommended for the half-year ended Dec. 31, 1943.

Mr. Frank H. Jones, M.Inst.C.E. (Deputy Chairman), seconded the resolution, which was carried unanimously.

The retiring Directors were re-elected, the retiring Auditor was re-appointed, and the proceedings terminated with votes of thanks to the Chairman and Directors and also to the Managing Director, staffs, and workmen, which were acknowledged by the Chairman and Mr. Percy E. Browne, the Managing Director.

Diary

Mar. 25.—Yorkshire Junior Gas Association: Visit to the Neepsend Works of the Sheffield & District Gas Company, 2.15 p.m.

Mar. 25.—Western Junior Gas Association, Bristol: Paper on "High Pressure Storage and Distribution" by B. G. Hawkins.

Mar. 25.—Manchester and District Junior Gas Association: Paper by J. M. Brown on "Steam Production and Use in Gas-Works Practice."

Mar. 27.—B.C.G.A. Domestic Heat Services Committee: Gas Industry House, 2.30 p.m.

March 29.—London and Southern District Junior Gas Association: Gas Industry House, 7 p.m. Paper by R. J. Pepper on "Service Organization."

Mar. 30.—B.C.G.A. Executive Committee: Gas Industry House, 1 p.m., preceded by buffet luncheon at 12.30 p.m.

Mar. 30.—Industrial Gas Centres Committee: Gas Industry House, 10.0 a.m.

Mar. 30.—Midland Counties Coke Association: Annual General Meeting, King Edward House, Birmingham, 2.30 p.m.

April 5.—Southern Association (Eastern District): Gas Industry House, 2.30 p.m. Paper by W. K. Tate, M.A., Assoc. M.Inst.C.E.

April 8.—Scottish Junior Gas Association: Granton Gas-Works, Edinburgh.

April 14.—Manchester District Association of Gas Engineers: Annual Meeting, Midland Hotel, Manchester, 2.30 p.m.

April 29.—Western Junior Gas Association: Exeter. Presidential Address and Annual Meeting.

June 13–14.—Institution of Gas Engineers: Annual Meeting, Edinburgh.

Thousands of Visitors have attended an exhibition at the Regent Street, London, showrooms of Kodak, Ltd., of photographs taken by the British Council, representing a complete cross-section of English life as depicted by British Council propaganda abroad. Among the industrial pictures the Gas Industry gets full credit for making the best use of the country's staple raw material.

When Lancs Foundry Coke Sports Club, Altham (Accrington), handed over their tenth hundred pounds to complete the endowment of a bed at Accrington Victoria Hospital, they reached a red letter day. Now they have set themselves the task of raising £750 for the new fracture clinic.

Six Workmen in the employ of Ewart & Son, Ltd., have a combined total of 145 years of continuous service to their credit. A. Cox heads the list with 32 years; followed by B. King, 30 years; A. Redding, 24 years; B. Hill, 22 years; R. Rusten, 19 years; and C. Cox, 18 years. During these years they have turned out a variety of products, including geyser parts, wheel discs for motor cars, boilers for gas coppers, and since the war they have been busily engaged on war materials.

A Series of Cookery Demonstrations by the Ministry of Food has been held recently in the showrooms of the Newport Gas Company. The opening ceremony was performed by the Mayoress, who was welcomed by Mr. J. F. Rust, Engineer to the Company, who mentioned that in 1943, 8,000 women had attended demonstrations at the showrooms.